university of groningen

University Medical Center Groningen

University of Groningen

Sustainability of the prevention of passive infant smoking within well-baby clinics

Crone, MR; Verlaan, M; Willemsen, MC; van Soelen, P; Reijneveld, SA; Sing, RAH; Paulussen, TGWA

Published in:
HEALTH EDUCATION & BEHAVIOR

DOI:
10.1177/1090198105276296

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2006

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):
Crone, MR., Verlaan, M., Willemsen, MC., van Soelen, P., Reijneveld, SA., Sing, RAH., & Paulussen, TGWA. (2006). Sustainability of the prevention of passive infant smoking within well-baby clinics. *HEALTH EDUCATION & BEHAVIOR*, *33*(2), 178-196. https://doi.org/10.1177/1090198105276296

Copyright
Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the “Taverne” license. More information can be found on the University of Groningen website: https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment.

Take-down policy
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): http://www.rug.nl/research/portal. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Download date: 06-05-2023

Health Education & Behavior

http://heb.sagepub.com

Sustainability of the Prevention of Passive Infant Smoking Within Well-Baby Clinics

M. R. Crone, M. Verlaan, M. C. Willemsen, P. van Soelen, S. A. Reijneveld, R. A. Hira Sing and T. G. W. M. Paulussen

Health Educ Behav 2006; 33; 178
DOI: 10.1177/1090198105276296

The online version of this article can be found at:
http://heb.sagepub.com/cgi/content/abstract/33/2/178

Published by:

http://www.sagepublications.com

On behalf of:

Society for Public Health Education

Additional services and information for *Health Education & Behavior* can be found at:

Email Alerts: http://heb.sagepub.com/cgi/alerts

Subscriptions: http://heb.sagepub.com/subscriptions

Reprints: http://www.sagepub.com/journalsReprints.nav

Permissions: http://www.sagepub.com/journalsPermissions.nav

Citations (this article cites 15 articles hosted on the
SAGE Journals Online and HighWire Press platforms):
http://heb.sagepub.com/cgi/content/abstract/33/2/178#BIBL

Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007

© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.

Sustainability of the Prevention of Passive Infant Smoking Within Well-Baby Clinics

M. R. Crone, PhD
M. Verlaan, MSc
M. C. Willemsen, PhD
P. van Soelen
S. A. Reijneveld, MD, PhD
R. A. Hira Sing, MD, PhD
T. G. W. M. Paulussen, PhD

This study assessed the antecedents of continued use of an education program to prevent passive smoking in infants. It consists of a booklet for parents and a manual for health professionals describing a five-step procedure for discussing passive smoking. A questionnaire was sent to 67 managers, 670 nurses, and 335 physicians working in well-baby clinics (response rate: 70%, 53%, 47% respectively). Questions concerned the completeness of use, level of institutionalization, and characteristics of the organization, the user, and the dissemination strategy. Seventy-one percent of nurses and 42% of physicians worked with the program. They foremost provided the first three steps of the five-step procedure. Physicians' completeness of use was related to their perceived responsibility in providing this education, and nurses' use was related to their perceived self-efficacy, responsibility, training attendance, participation in the adoption decision, and level of institutionalization. Diffusion efforts should focus on improving the completeness of use and level of institutionalization.

Keywords: *dissemination; institutionalization; health education; passive smoking*

There is clear evidence that passive smoking in childhood can lead to serious adverse health outcomes such as respiratory illnesses, asthma, sudden infant death syndrome, and ear infection (Cook & Strachan, 1999; World Health Organization [WHO], 1999). The literature also provides some evidence for adverse health effects like cancer, cardiovascular disease, excessive infant crying, meningococcal disease, and an increased risk of behavioral problems (Bofetta, Trédaniel, & Greco, 1999; Eskenazi & Castorina, 1999; Moskowitz, Schwartz, & Schieken, 1999; Reijneveld, Brugman, & Hirasing, 2000). This

---

M. R. Crone and M. Verlaan, TNO Quality of Life, Leiden, the Netherlands. M. C. Willemsen and P. van Soelen, STIVORO, the Hague, the Netherlands. S. A. Reijneveld, University Medical Center Groningen University, Groningen, the Netherlands. R. A. Hira Sing, Department of Social Medicine, Institute for Research in Extramural Medicine, VU University Medical Centre, Amsterdam. T. G. W. M. Paulussen, TNO Quality of Life, Leiden, the Netherlands.

Address reprint requests to M. R. Crone, TNO Prevention and Health, P.O. Box 2215, 2301CE Leiden, the Netherlands; phone: +31-(0)71-5181899; fax: +31-(0)71-5181915; e-mail: mr.crone@pg.tno.nl.

Health Education & Behavior, Vol. 33 (2): 178-196 (April 2006)
DOI: 10.1177/1090198105276296
© 2006 by SOPHE

Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007
© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.

emphasizes the importance of the prevention of secondhand smoking by children. To support this, STIVORO, the national nongovernmental center for tobacco control, developed and disseminated an education program on passive smoking, titled "Smoking? Not in the Presence of the Little One," in 1997/1998. This program consists of a booklet for parents and a manual for health professionals describing a five-step procedure for educating parents about passive smoking. These steps are (a) assessing smoking behavior at home and in the presence of the child, (b) providing information about the possible health consequences of passive smoking, (c) assessing parental readiness to prevent passive smoking and discussing possible house rules, (d) discussing barriers for implementation of the house rules, and (e) follow-up guidance targeting the maintenance of the house rules.

Between 1997 and 1999, the program was disseminated by STIVORO among all Dutch well-baby clinics by means of:

- a mailing—an exemplary set of education materials was sent to all home care organizations running well-baby clinics along with an invitation to attend a free preimplementation training (end of 1997);
- a preimplementation training for physicians and nurses (January/February 1998);
- a first mass media campaign—at the time the well-baby clinics started to implement the education program, this nationwide campaign was launched targeting parents (March 1998);
- a follow-up mass media campaign, specifically targeting the parents' family members and friends (1999).

Overall, this nationwide attempt to reduce passive smoking among infants appeared to be rather successful. A first evaluation study in 1999 among 85% of all home care organizations indicated that 91% of the well-baby clinics had initially implemented the program (STIVORO, 1999). Simultaneously, the overall prevalence of passive infant smoking in the Netherlands fell from 41% in 1996 to 18% in 1999 (Crone, Reijneveld, Willemsen, & Hira Sing, 2003). It was, however, not possible to determine to what extent the media initiatives (TV spot) or the exposure to the education program contributed to the observed decrease in passive smoking.

After completing its initial dissemination, the program's continuation within the well-baby clinics became a growing concern. According to Rogers (1995), an innovation passes four stages: dissemination, adoption, implementation, and continuation. Within this conceptual framework, continuation is defined as the stage in which an innovation remains utilized after its initial implementation. Many experiences show that initial use of an innovation does not guarantee continuation (O'Loughlin, Renaud, Richard, Sanchez-Gomes, & Paradis, 1998). Discontinuation limits the potential impact of an education program like "Smoking? Not in the Presence of the Little One" (Goodman, McLeroy, Steckler, & Hoyle, 1993; Shediac-Rizkallah & Bone, 1998).

Two years after completing the initial introduction of "Smoking? Not in the Presence of the Little One," the present study was conducted to examine the program's continuation within the well-baby clinics. It addressed the following research questions:

- What percentage of physicians/nurses (still) uses the program in 2001?
- What is the level of institutionalization of this education program?
- What are the antecedents of the program's completeness of use?

Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007
© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.

METHOD

In this study, professionals in well-baby clinics completed a questionnaire, which was based on a research framework. This research framework is explained below.

Research Framework

In most Dutch health organizations, health professionals have considerable professional autonomy concerning the adoption and implementation of innovations. For example, nurses and physicians in well-baby clinics provide health education at their own professional discretion. This made us assume that the social and psychological predisposition of the individual health professional relative to the program attributes would be most critical for the longevity of an innovation such as "Smoking? Not in the Presence of the Little One." We used the theory of planned behavior and the social cognitive theory as bases for structuring the social and psychological determinants of the health professionals' utilization of the program (Bandura, 1986; Paulussen, 1994). According to our research framework, graphically represented by Figure 1, attitudes, social influences, and self-efficacy are most proximal to the health professionals' completeness of use. Arrangements at the organizational level, the innovation's design, and the innovation strategy are assumed to have an indirect impact on the program's utilization by influencing the motivational factors of the health professional.

The attitudinal component was subdivided into four belief structures: program-specific outcome beliefs, target-group–specific outcome beliefs, perceived responsibility, and perceived personal advantages. Program-specific outcome beliefs refer to the perceived importance and feasibility of the intended learning objectives of this program (Paulussen, 1994). Target-group–specific outcome beliefs are the users' expectations that the program's effectiveness might differ between specific groups of parents. Interviews with health professionals working in well-baby clinics had indicated that a distinction should be made between smoking versus nonsmoking parents and between native versus nonnative Dutch parents. According to Ajzen (1991), also more general preferences, like feelings of responsibility or moral obligation, might additionally capture significant proportions of variance in intentions. In this particular case, for example, the respondents may feel positive about the intended educational outcomes, but they may not think it is their task to provide the education. Perceived personal advantages refer to the advantages program utilization might have for the users themselves, such as raising professional status or positive feedback from parents.

In addition, the social context of the user may affect program utilization (Fullan & Stiegelbauer, 1991; Paulussen, 1994). Social influences were divided into subjective norms, perceived social support, and modeling. Subjective norms refer to social referents in the users' task environment that provide normative standards for their decision making about using the innovations. Social support refers to the expected active support of others in using the program, whereas modeling refers to the perceived behavior of relevant others regarding the innovation.

According to Bandura (1986), behavioral change is not only directed by valued outcomes but also by self-efficacy. Self-efficacy refers to a user's perceived competence regarding an intended behavior. We have chosen to use Bandura's self-efficacy concept instead of Ajzen's (1991) comparable concept of perceived behavioral control. A recent

Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007
© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.

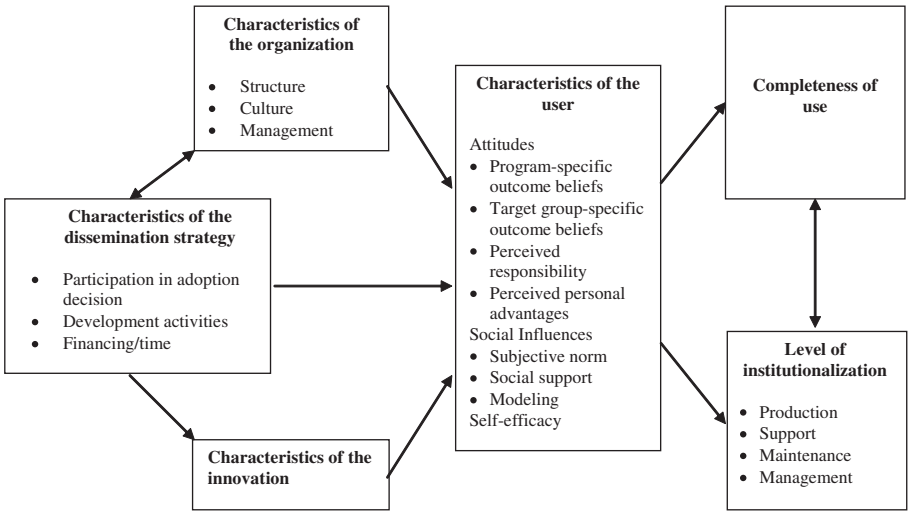

Figure 1. The theoretical framework.

meta-analytic review suggests that self-efficacy is the preferred measure of perceived control, whereas self-efficacy is more clearly defined and operationalized and explains somewhat more of the variance in intention (Armitage, & Conner, 2001). In studies on innovation processes, self-efficacy has emerged as an important determinant of the implementation of health education interventions (Paulussen, 1994; Renaud et al., 1997).

Institutionalization was conceptualized using Goodman et al.'s (1993) model of levels of institutionalization. This model indicates that a process of institutionalization is constituted by the level of routinization and niche saturation in an organization. The first step of institutionalization is called passage; this is the first time the innovation is actually applied. The next step, routinization, involves the growing permanency of an innovation. The last step, niche saturation, refers to maximum institutionalization; the innovation is seen as permanent in the organization. To be fully institutionalized, an innovation must be niche saturated within four subsystems: the production, managerial, support, and maintenance subsystems. In our view, the level of institutionalization may ultimately affect the intended learning outcomes of parents by facilitating program utilization by individual health professionals.

More general characteristics on the organizational level such as structure, culture, and management of the organization may also be relevant. The structure is the way the organization is organized to achieve its objectives (Boonstra, 1992). Examples of structural factors are hierarchical structure, division of tasks, and workload (Fiore, 1995; Grol, 1997). The culture consists of the ideas, values, and norms resulting from shared experiences and learning within an organization (Janssen Andeweg, 1994). The management of the organization is seen in terms of prevailing communication and management style. Communication style involves factors such as clarity, feedback, and communication channels (Boonstra, 1992; Brown, 1999; Conroy & Shannon, 1995; Funk, Tornquist, & Champagne, 1995; Lewis & Seibold, 1996). Management style can be divided into participative, task-driven, and relation-driven style (Steensma, 1977).

Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007
© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.

Characteristics of the innovation itself also have been shown to affect innovation processes, examples being relative advantage, complexity, observability, and compatibility (Crandall, 1989; Doyle & Ponder, 1977; Grol, Everdingen, & Casparie, 1994; Rogers, 1995). Finally, the applied dissemination strategy may also be more, or less, successful in facilitating the intended innovation process. Examples of the conditions for an effective strategy are the combination of bottom-up and top-down strategies, sufficient information, funding, and evaluation (Cousins & Leithwood, 1993).

Study Design

Interviews were conducted with nurses and physicians employed by well-baby clinics and with the managers of the clinics. The interviews were used to explore salient beliefs about the program among members of the intended user population. These interviews and the literature on innovation dissemination provided leads for writing the questionnaire items by which the factors in our framework were measured. After pretesting, the questionnaire was distributed to all Dutch home care organizations that offer well-baby care with the exception of two that participated in the pretest. Each organization received 16 forms: 5 for physicians, 10 for nurses, and 1 abbreviated version for the manager. The questionnaires were designed in such a way that both users and nonusers of the program could complete the questionnaire. Questions about the characteristics of the user and completeness of use were excluded from the manager's questionnaire. Finally, 670 forms for nurses, 335 forms for physicians, and 67 forms for managers were sent to the organizations. In total, 358 of the 670 nurses (response = 53%), 157 of the 335 physicians (response = 47%), and 47 of the 67 managers (response = 70%) who were sent the questionnaire completed and returned it. The responding nurses and physicians represented 56 organizations (84% of all Dutch home care organizations).

The Questionnaire

The operationalization of the completeness of use index and the level of institutionalization index are described below. A brief overview of the other constructs in our framework, including internal consistency and scale characteristics, is shown in Table 1.

Completeness of Use

Completeness of use was measured by seven questions: five referring to the critical steps in the prescribed education procedure (5-point Likert-type scale), one question about making a note in the medical file of the child after passive smoking had been discussed (5-point Likert-type scale), and one question about the proportion of parents visiting the health professional that were educated (7-point Likert-type scale).

Item-response theory indicated that the seven items represented a good fit after rescoring the answers of the separate items into four categories. The distances between the response options were between 1.4 and 5.0 logits, the outfit scores ranged from 0.5 to 1.6, and the separation index was 0.75 (Cronbach's $\alpha = .74$). The response choices were assigned to the respondents on a logit scale ranging from –2, 5 (low completeness of use) to 4, 3 (high completeness of use; Schulman, Trujillo, & Karney, 2001).

Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007
© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.

Table 1. The Variables Included in the Analyses

Concepts	Verifiable Indicators	*n* Questions	Categories (Original)	Outfit Range[a]	Separation Index[b]
1 Characteristics of the organization					
1.1 Structure	1.1.1 Workload	1	–4 to 4		
1.2 Culture	1.2.1 Number of physicians	1	4 to 43		
	1.2.2 Number of nurses	1	8 to 87		
	1.2.3 Number of children	1	2,625 to 34,500		
	1.2.4 Proportion of immigrant children	1	1 to 7		
1.3 Management style	1.3.1 Communication	4	0 to 5 (7-point Likert-type scale)	0.68-1.11	.93
	1.3.2 Management	3			
2 Characteristics of the user					
2.1 Program-specific outcome beliefs[c]	2.1.1 Importance of different goals of program	5	0 to 3 (7-point Likert-type scale)	0.48-1.12	.90
	2.1.2 Evaluations of feasibility of these goals	5	0 to 3 (7-point Likert-type scale)	0.55-1.20	.89
2.2 Target-group–specific outcome beliefs	2.2.1 Evaluations of feasibility of outcome among specific groups of parents	4	0 to 6 (7-point Likert-type scale)	0.67-1.13	.77
2.3 Responsibility	2.3.1 Responsibility of home care organization to prevent passive smoking	5	0 to 3 (7-point Likert-type scale)	0.70-0.94	.83
2.4 Perceived advantages	2.4 Personal advantages of using the program	4	0 to 3 (7-point Likert-type scale)	0.66-0.93	.50
2.5 Subjective norm work[c]	2.5.1 Normative beliefs of colleagues about respondent's use of the program	3	0 to 6 (7-point Likert-type scale)	0.56-1.08	.91
	2.5.2 Motivation to comply to opinion of colleagues	3	0 to 6 (7-point Likert-type scale)	0.40-0.92	.94
2.6 Subjective norm parents[c]	2.6.1 Normative beliefs of parents about respondent's use of the program	4	0 to 6 (7-point Likert-type scale)	0.63-0.80	.88
	2.6.2 Motivation to comply to the opinion of parents	4	0 to 6 (7-point Likert-type scale)	0.48-0.59	.95
2.7 Social support	2.7.1 Active support of colleagues to use the program	2	–3 to 3 (7-point Likert-type scale)	—[d]	.75

(continued)

© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.
Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007

Table 1 (continued)

Concepts	Verifiable Indicators	*n* Questions	Categories (Original)	Outfit Range[a]	Separation Index[b]
2.8 Modeling	2.8.1 Use of the program by others	2	–3 to 3 (7-point Likert-type scale)	—[d]	.73
2.9 Self-efficacy	2.9.1 Ability to use the program	5	0 to 4 (7-point Likert-type scale)	0.65-1.04	.66
	2.9.2 Ability to inform specific groups of parents	4	0 to 4 (7-point Likert-type scale)	0.69-0.90	.89
3 Characteristics of the innovation					
3.1 Characteristics of the education program	Relative advantage, complexity, observability, compatibility, attractiveness, instrumentality, rigidity	7	0 to 4 (7-point Likert-type scale)	0.58-1.14	.79
4 Characteristics of the dissemination strategy					
4.1 Participation in the adoption	4.1.1 Formal adoption decision	1	No/yes		
	4.1.2 Participation in adoption decision	1	No/yes		
4.2 Development activities	4.2.1 Training	1	No/yes		
	4.2.2 Coordinator	1	No/yes		
	4.2.3 Evaluations	1	No/yes		
	4.2.4 Ability to try	2	–3 to 3 (7-point Likert-type scale)	—[d]	.66
4.3 Resources	4.3.1 Finances and time	1	No/yes		
5 Background variables					
5.1 Age	Age of respondent	1	21 to 60		
5.2 Number of years work experience	Years working as nurse/physician	1	0 to 10		
5.3 Smoking	Smoking by respondent	1	No/yes		

a. Outfit statistics indicate unexpected responses to an item and assess the degree to which responses reflect random error. Values greater than 2.0 indicate that there is more unexpected randomness.

b. Separation index is a reliability measure comparable to Cronbach's α.

c. The two constructs were included separately. Their multiplicative composites were not used because their inclusion did not significantly change the percentage of variance explained regarding completeness of use after inclusion of the separate constructs.

d. No item-response theory analysis was done, consisting of just two items; Cronbach's α was calculated instead.

© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.
Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007

Level of Institutionalization

The level of institutionalization was measured by the extent to which routinization and niche saturation had taken place in the production, support, maintenance, and managerial subsystem. Seven activities appeared to represent these four subsystems, as was confirmed by factor analysis:

- Production: the presence of (a) written guidelines for using the program, (b) evaluation procedures for the use of the program, and (c) guidelines for making note of the education process in the child's file.
- Maintenance: (d) the allocation of time and/or funding.
- Support: (e) training new staff in the use of the program.
- Managerial: (f) formal assignment of a coordinator to the program and (g) feedback of evaluation outcomes to the staff.

For each activity, a routinization and a niche saturation question was formulated. The routinization question assessed the number of years the activity was already present in the organization. As proposed by Goodman and Steckler (Goodman et al., 1993; Steckler, Goodman, McLeroy, Davis, & Koch, 1992), the answers were recoded into four categories: "no passage" to "four or more iterations." For example, in the case of the coordinator, no passage means that no coordinator was assigned to the program, and four or more iterations means that the coordinator had already been present for more than 2 years. The niche saturation was assessed by asking the respondents how permanent they thought the activities were in their organization. The answers were recoded into four categories varying from *no niche saturation* when the activity was not seen as permanent to *maximum niche saturation* when the activity was thought of as being definitely permanent. In every subsystem, the routinization and the niche saturation questions were summed thereby resulting in a Routinization and a Niche Saturation Scale in each subsystem. The Routinization and Niche Saturation Scales within each subsystem appeared to be highly correlated (varying from $r = .81$ to $r = .95$). Therefore, the two scales in each subsystem were summed, resulting in four scales representing the level of institutionalization in the production, maintenance, support, and managerial subsystems.

Analyses

Analyses were done separately for physicians and nurses using the Statistical Packet for Social Sciences 11.5 (SPSS). Factor analysis, reliability analysis (Cronbach's α), and item-response theory (RUMM2020) were applied to construct the scales used for modeling completeness of use. Item-response theory using a rating scale method was used to convert response choices to quantitative linear measures (logits; Schulman et al., 2001). Regression analyses were used to explore whether the assumed multiplicative versions of the attitude and the subjective norm concepts were better than the additive versions (Evans, 1991). Spearman correlation coefficients were calculated between the constructs in our framework. The factors that significantly correlated with the criterion ($p < .05$) were selected for modeling completeness of use. Initially, multilevel regression techniques were applied to account for the possibility of clustering effects among nurses or physicians and home care organizations (MlnwiN; Goldstein et al., 1998). Because the variables at the level of the organization did not affect completeness of use at the individual level, the analyses proceeded using linear regression (stepwise) following the causal

Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007
© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.

pathway represented by Figure 1 starting with the inclusion of the level of institutionalization, followed by the characteristics of the user, the innovation and the organization, and then the innovation strategy. Finally, significant predictors of completeness of use were analyzed in more detail by means of *t* tests using the mean as a cutoff point to dichotomize completeness of use.

RESULTS

Six percent of the responding nurses, 19% of the physicians, and 2% of the managers appeared to be unaware of the existence of this education program. Seventy-one percent of the nurses, 42% of the physicians, and 83% of the managers indicated that they used the program.

There appeared to be a wide variation in the proportion of users within home care organizations. In the organizations with nurses and physicians that had completed the questionnaire, the proportion of users among nurses varied between 19% and 100% (66% on average). In two organizations, none of the nurses used the program.

Completeness of Use

Thirty-three percent of the physicians and 82% of the nurses using the program provided the education to a majority of parents. The first three steps of the five-step procedure were applied most often. Discussing barriers to the prevention of passive smoking and, in particular, the intended follow-up was implemented less frequently (Table 2).

The difference between the nurses' and the physicians' mean score for completeness was statistically significant: 0.9 (SD = 1.2) versus 0.1 (SD = 1.1), respectively (scale range –2.5 to 4.3), $F = 28.4$, $p < .001$).

Level of Institutionalization

No differences were found between nurses and physicians for their perceived level of institutionalization within their organization. The level of institutionalization appeared to be the highest within the production subsystem ($M = 1.9$, $SD = 0.8$), followed by the managerial subsystem ($M = 1.6$, $SD = 0.9$), the maintenance subsystem ($M = 1.3$, $SD = 0.8$), and the support subsystem ($M = 1.2$, $SD = 0.6$). Overall, the managers perceived higher levels of institutionalization than did nurses and physicians (Table 2).

Antecedents of Completeness of Use

Table 2 shows the correlation coefficients for the different factors with completeness of use for physicians and nurses. Nurses' completeness of use correlated with nearly all factors in the research framework except those accounting for the characteristics of the organization. The physicians' completeness of use only correlated with perceived responsibility for educating parents on secondhand smoking. The regression analysis confirmed this association between perceived responsibility and physicians' use. In the regression model, nurses' completeness of use appeared to be best explained by their perceived level of institutionalization in the production subsystem, their self-efficacy in using the program, participation in the adoption decision, and attendance at the program's training course (Table 3).

Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007
© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.

Table 2. Summary Statistics of the Factors Within the Research Framework: Means, Correlations With Completeness of Use, and Differences Between Nurses, Physicians, and Managers Who Use the Program

Measured Variables (Scale Range)	Nurses (n = 255)		Physicians (n = 68)		Managers (n = 39)
	M or %	r Completeness	M or %	r Completeness	M or %
Using of steps when providing education to parents					
Step 1: Smoking assessment (always/often)	93%		65%		
Step 2: Health consequences (always/often)	92%		75%		
Step 3: Discussing house rules (always/often)	79%		53%		
Step 4: Discussing barriers (always/often)	68%		47%		
Step 5: Follow-up (always/often)	31%		26%		
Completeness of use (–2.5-4.1)	0.94	—	0.07***	—	
Characteristics of the organization					
Level of institutionalization					
Production (1-4)	1.9	0.42	1.9***	*ns*	2.5
Support (1-4)	1.2	*ns*	1.1***	*ns*	1.7
Maintenance (1-4)	1.3	0.22	1.2***	*ns*	1.8
Management (1-4)	1.6	0.18	1.5***	*ns*	2.3
Management style (–7.6-7.6)	1.2	*ns*	1.0	*ns*	
Workload (–4-4)	–1.8	*ns*	–1.7	*ns*	
n physicians	17.7	*ns*	15.7	*ns*	16.9
n nurses	34.2	*ns*	31.7	*ns*	33.1
n children	10,565	0.18	9,565	*ns*	11,088
% immigrant children	5.3	*ns*	5.3	*ns*	
Characteristics of the user					
Importance beliefs (–5.3-5.9)	3.7	*ns*	3.8	*ns*	
Feasibility evaluations (–4.3-6.8)	1.2	0.22	0.8	*ns*	
Target-group–specific outcome beliefs (–7.1-6.3)	1.5	0.14	1.2	*ns*	
Responsibility (–1.8-4.7)	1.4	0.17	1.2	0.28	1.3
Perceived personal advantages (–4.5-3.1)	–0.3	0.23	–1.0***	*ns*	

(continued)

© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.
Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007

Table 2 (continued)

Measured Variables (Scale Range)	Nurses (n = 255)		Physicians (n = 68)		Managers (n = 39)
	M or %	r Completeness	M or %	r Completeness	M or %
Normative beliefs colleagues (–3.4-7.2)	4.1	0.34	3.1**	*ns*	
Motivation to comply colleagues (–9.6-10.9)	–0.6	*ns*	–0.9	*ns*	
Normative beliefs parents (–7.9-7.0)	–0.0	0.17	–1.4***	*ns*	
Motivation to comply parents (–8.9-10.0)	–0.1	*ns*	0.6	*ns*	
Social support (–3-3)	1.0	*ns*	1.2	*ns*	
Modeling (–3-3)	1, 1	0.28	1.5**	*ns*	
Self-efficacy in use (–1.8-2.2)	0.2	0.25	–0.5***	*ns*	
Self-efficacy informing specific groups (–3.9-6.2)	1.3	0.24	0.8		
Characteristics of the innovation (–1.05-9.25)	2.6	0.23	2.0*	*ns*	1.3
Characteristics of the dissemination strategy					
Ability to try (–3-3)	0.0	0.21	–0.6***	*ns*	
% evaluation	28%	0.21	27%	*ns*	41%
% training	52%	0.26	65%	*ns*	59%
% appointed coordinator	30%	0.15	21%	*ns*	23%
% allocation of finance/time	9%	*ns*	4%	*ns*	15%
% organizations formally adopting the program	87%	0.16	93%	*ns*	92%
% participation in adoption decision	17%	0.13	15%***	*ns*	82%

NOTE: *ns* = not significant.
*p < .05. **p < .01. ***p < .001.

© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.
Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007

Table 3. Results of the Stepwise Regression Analyses on the Physicians' and Nurses' Completeness of Use of the Education Program

	Physicians (n = 62)[a]		Nurses (n = 246)[a]	
	Adjusted B (R^2 = .08)	$p <$	Adjusted B (R^2 = .30)	$p <$
Characteristics of the user				
Perceived responsibility	0.18 (0.02-0.33)	.05	0.19 (0.11-0.27)	.001
Self-efficacy in using			0.20 (0.05-0.35)	.05
Characteristics of the dissemination strategy				
No training			0	.05
Training			0.31 (0.05-0.57)	.05
Personally participated in adoption decision				.05
No			0	.05
Yes			0.42 (0.07-0.77)	.05
Level of institutionalization				
Production subsystem			0.41 (0.24-0.58)	.001

a. n does not add to 68 and 255 because of missing values.

When analyzing the nurses' self-efficacy expectations in more detail (Table 4), it appeared that nurses with relatively low scores for completeness of use were generally less self-confident in reducing parental barriers in implementing house rules. Compared to nurses with higher levels of use, nurses with lower scores were also less self-confident about providing the education under time pressure. The nurses scored relatively high on their perceived responsibility for educating parents about passive smoking. Nurses with lower completeness of use perceived it less as their task to provide the education than did nurses with higher completeness of use.

As far as the level of institutionalization is concerned, compared to nurses with lower scores for completeness of use, nurses with higher scores perceived all activities in the production subsystem as being more permanent (Table 4). The guidelines for making note of the education process in the medical file of the child appeared to be most institutionalized.

DISCUSSION

The education program "Smoking? Not in the Presence of the Little One" is used by the majority of nurses and by a significantly lower proportion of physicians. When the program was used, most parents were exposed to the first three steps of the five-step procedure. The most important predictor of completeness of use by physicians appeared to be their perceived responsibility to educate parents on passive smoking. The nurses' completeness of use was best predicted by their perceived institutionalization in the production subsystem, perceived self-efficacy, perceived responsibility, attendance to the training course, and participation in the adoption decision.

Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007
© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.

© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.

Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007

Table 4. The Individual Questions Constituting the Significant Predictors of Nurses' Completeness of Use by Dichotomized Completeness of Use

	Low Completeness of Use (Score < 1; $n = 124$)[a] Mean score	High Completeness of Use (Score ≥ 1; $n = 123$)[a] Mean score	Total ($n = 247$)[a] Mean score
Responsibility (score 0 to 3)			
Passive smoking is an important subject about which the home care organization should provide education.	2.4	2.7***	2.6
I think it is the responsibility of the nurse to give standard information about passive smoking.	2.0	2.5***	2.2
I think it is the responsibility of the physician to give standard information about passive smoking.	1.5	1.9***	1.7
I think that the well-baby nurse should inform parents about passive smoking when children have problems associated with it.	1.9	2.3**	2.1
I think that the well-baby physician should inform parents about passive smoking when children have problems associated with it.	1.7	2.1**	1.9
Self-efficacy in using the education (score 0 to 4)			
Do you think you will be able			
to keep enough educational material in stock?	2.6	2.5	2.5
to pay attention to passive smoking even when you have little time during the contact?	2.2	2.5**	2.3
to make parents who do not see the importance of preventing passive smoking implement house rules?	1.0	1.2	1.1
to discuss passive smoking when you enter a home where there is an obvious smell of tobacco smoke?	2.7	2.8	2.8
to reduce parental barriers in implementing house rules?	1.8	2.1**	1.9

Institutionalization in production subsystem: niche saturation (score 1 to 4)			
Permanency of guidelines on how to use the program	1.6	2.1**	1.9
Permanency of guidelines on how to register the education process in the personal file of the child	1.7	2.7***	2.2
Permanency of the evaluation of the education	1.3	1.9***	1.6
Training			
Attendance training	42%	62%**	52%
Adoption decision			
Participation in the adoption decision	14%	20%	17%

a. *n* does not add to 255 because of missing values.
**$p < .01$. ***$p < .001$.

© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.
Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007

Methodological Considerations

Because the overall response among the nurses and physicians was 51%, selection bias cannot be excluded. Users of the program can be overrepresented, in which case the actual percentage of users in the intended user population might be lower than the reported estimates of 71% for nurses and 42% for physicians. We could not assess possible selection bias because we did not collect any data on the nonresponders, and reference data on background characteristics of physicians and nurses working in well-baby clinics are not available. We did compare our sample with another sample of physicians and nurses working in well-baby clinics on three characteristics: years of working experience and the number of physicians and nurses working in the organization. No statistically significant differences were found. This still does not, however, exclude the possibility of selection bias, even when taking into account that nonresponse bias may be of less concern in physician surveys than in surveys of the general public (Kellerman & Herold, 2001).

In a worst-case scenario—that is, all nonresponders are nonusers—the data of this study suggest that at least 38% of the nurses and 20% of the physicians actually use the education program. This is still a fairly good implementation rate 2 years after completing the initial dissemination project. It is also important to notice that the responding nurses and physicians are employed by 84% of all home care organizations in the Netherlands, thus representing a majority of the organizations. Social desirability may also have affected the results, especially leading to overestimated prevalence or mean scores. But as far as these biases have been systematic, and we have no indication for the opposite either, correlation analyses are expected to be less vulnerable to selective attrition and social desirability than the estimates of prevalence.

In this study, the theory of planned behavior and the social cognitive theory grounded the development of the integrated model that we applied for explaining processes-of-innovation decision making (Ajzen, 1991; Bandura, 1986). We have chosen to include Bandura's (1986) concept of self-efficacy in our theoretical framework instead of perceived behavioral control as defined by Ajzen (1991). There is, however, still an ongoing debate as to whether perceived behavioral control can be replaced by or is the same as self-efficacy (Armitage & Conner, 2001; Bandura, 1992). One of our reasons to use self-efficacy was that a meta-analysis on the efficacy of the theory of planned behavior showed that self-efficacy is the preferred measure of perceived control (Armitage & Conner, 2001). Another, maybe more important, reason was that in other studies on innovation processes, self-efficacy had been shown to be an important predictor of implementation behavior (Paulussen, 1994; Renaud et al., 1997). Our results confirm this association of self-efficacy with the nurses' behavior.

We had no intention of assessing the added value of our model compared to the originally conceived models by Ajzen (1991) and Bandura (1986), respectively. Nevertheless, the results of the regression analyses indicated a fairly good fit of the applied model, especially for explaining the nurses' completeness of use. This was confirmed by an additional path analysis of the nurses' data. The comparative fit index of .98 (0 meaning no fit and 1 meaning excellent fit) indicated that the level of institutionalization (production subsystem) and the characteristics of the user (attitudes, self-efficacy), which, in turn, are influenced by the characteristics of the innovation and the dissemination strategy, represented an adequate fit to the data.

Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007
© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.

Considering the Outcomes of Other Studies

It is not surprising that the physicians' completeness of use was primarily explained by the extent to which they feel themselves responsible for educating parents about passive smoking. In most well-baby clinics, the tasks are divided between the physicians and nurses. Nurses usually address health education issues with parents.

The most important predictor for the nurses' completeness of use appeared to be their perceived level of institutionalization of the program in the production subsystem, in particular, the presence of guidelines for making notes of the education process in the child's medical file. These guidelines existed according to half of the nurses. Institutionalization in the other subsystems (managerial, maintenance, and support) had relatively less impact on nurses' program implementation. This is mainly because of the fact that little had changed in these subsystems. These results correspond to the findings of Goodman et al. (1993). They concluded that health education programs first get institutionalized in the production subsystem, followed by the managerial subsystem and then the maintenance and support subsystems.

Our finding that the managers of the home care organization perceived higher levels of institutionalization than nurses and physicians corresponds with results of other studies. Others have indicated similar discrepancies between management and staff with respect to the actual implementation of innovations within their organization (Paulussen, 1994; Pijpers, 1999). When perceived institutionalization by the manager was included in the analysis instead of perceived institutionalization by nurses, the level of institutionalization was no longer significantly associated with the nurses' completeness of use. This discrepancy suggests that on the management level, more attention is thought to be paid to the institutionalization of the program than is observed at the work floor. The managers therefore should invest more effort in promoting their activities on the level of institutionalization among nurses and physicians in their organization.

The importance of self-efficacy fits with the results of other studies on the antecedents of innovation processes (Paulussen, 1994; Renaud et al., 1997). Completeness of use was significantly higher among nurses who felt more confident about providing the education. Nurses' anticipated mastery with respect to reducing parental barriers and providing education under time pressure appeared to be particularly critical. Those steps of the education process that were implemented by the majority confirmed this finding. The last two steps, discussions about barriers and follow-up, were more often neglected. Nurses who had been trained in using the program had higher completeness of use. However, it was remarkable that training was not associated with higher levels of self-efficacy. Being trained was associated with a higher perceived institutionalization in the production subsystem, a less communication-driven management style, a higher score on the ability to try, more non-Dutch children in care, and more working experience. Considering these results, the lack of association between training and self-efficacy might be explained by the fact that the training mainly affected the nurses' completeness of use by improving both their awareness of and commitment to the proposed educational procedures. Training attendance might also be a weak indicator for the physician's or nurse's commitment to the innovation in case their manager more or less obliged them to do so.

Finally, having participated in the adoption decision seemed relatively important. Nurses who had participated used the program more completely. This result suggests that the motivation of nurses to provide the education is associated with being involved in the decision to use the program. It is, however, not possible to indicate whether participation

Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007
© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.

in the adoption decision has resulted in a higher motivation to provide the education or whether a higher motivation has triggered the nurses' participation in the adoption decision.

Implications for Practitioners

A high percentage of the health professionals worked with the education program "Smoking? Not in the Presence of the Little One." This high prevalence of use does not automatically imply complete use. Additional activities are necessary for improving completeness of use. One way is to overcome the nurses' perceived barriers to follow the last two steps of the five-step procedure. The training should therefore focus on strengthening self-efficacy expectations. Suggestions for designing these trainings can be derived from research on the conditions for effective staff development (Cousins & Leithwood, 1993) and social cognitive theory (Bandura, 1986). These findings suggest that it is necessary to incorporate the following training components: (a) a rationale behind the skills and strategies to be learned, (b) a demonstration of good practices (direct modeling), (c) opportunities for the practice of skill under simulated conditions (guided enactment), (d) performance feedback (nonevaluative), and (e) coaching during the self-directed application of acquired skills. It is important for more health professionals to be exposed to these training conditions. At the time of this study, only 50% of the users had received training. In addition, institutionalization in the production subsystem, as well as the other subsystems, should be further strengthened. A procedure should be developed for training new staff in using the program (maintenance subsystem). Home care organizations should allocate time and/or financial resources for attending necessary training (support subsystem). Each organization should appoint and instruct a coordinator who directs and monitors the program's implementation. Coordinators or program champions, people who strongly advocate for the continuation of an innovation, have proven their importance for the sustainability of innovations (Goodman & Steckler, 1989; Joyce & Schowers, 1988). They should not only advocate for continuation within their own organization, but they should also coach nurses and physicians during processes for the self-directed application of newly acquired skills.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*, 79-211.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology*, *40*, 471-499.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1992). On rectifying the comparative anatomy of perceived control: Comments on "cognates of personal control." *Applied Preventive Psychology*, *1*, 121-126.

Bofetta, P., Trédaniel, J., & Greco, A. (1999). *Parental tobacco smoke and childhood cancer* [WHO/NCD/TFI/99.11]. Geneva, Switzerland: Author.

Boonstra, J. J. (1992). *Integral organization development: Designing and fundamental changing processes in organizations*. Unpublished doctoral thesis, University of Leiden, Leiden, the Netherlands.

Brown, M. (1999). Communication, trust and organizational change at a manufacturing facility: A critical incident technique analysis (Logan Aluminum Inc.). *Dissertation Abstracts International*, *69*, 2598.

Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007
© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.

Conroy, M., & Shannon, W. (1995). Clinical guidelines: Their implementation in general practice. *British Journal of General Practice*, *45*, 371-375.

Cook, D. G., & Strachan, D. P. (1999). Health effects of passive smoking-10: Summary of effects of parental smoking on the respiratory health of children and implications for research. *Thorax*, *54*, 357-366.

Cousins, J. B., & Leithwood, K. A. (1993). Enhancing knowledge utilization as a strategy for school improvement. *Knowledge: Creation, Diffusion, Utilization*, *14*, 305-333.

Crandall, D. P. (1989, September). Implementation aspects of dissemination. *Knowledge: Creation, Diffusion, Utilization*, pp. 79-106.

Crone, M. R., Reijneveld, S. A., Willemsen, M. C., & Hira Sing, R. A. (2003). Parental education on passive smoking in infancy does work. *European Journal of Public Health*, *13*, 269-274.

Doyle, W., & Ponder, G. A. (1977). The practicality ethic in teacher decision making. *Interchange*, *8*, 1-12.

Eskenazi, B., & Castorina, R. (1999). Association of prenatal maternal or postnatal child environmental tobacco smoke exposure and neurodevelopmental and behavioral problems in children. *Environmental Health Perspectives*, *107*, 991-1000.

Evans, M. G. (1991). The problem of analyzing multiplicative composites. *American Psychologist*, *46*, 6-15.

Fiore, C. (1995). *Success and failure factors in organization change*. Unpublished doctoral thesis, University of Leiden, Leiden, the Netherlands.

Fullan, M., & Stiegelbauer, S. (1991). *The new meaning of educational change*. New York: Teachers College Press.

Funk, S. G., Tornquist, E. M., & Champagne, M. T. (1995). Barriers and facilitators of research utilization. An integrative review. *Nursing Clinics of North America*, *30*, 395-407.

Goldstein, H., Rasbash, J., Plewis, I., Draper, D., Browne, W., Yang, M., et al. (1998). *A user's guide to MlwiN*. London: Institute of Education, University of London.

Goodman, R. M., McLeroy, K. R., Steckler, A. B., & Hoyle, R. H. (1993). Development of level of institutionalization scales for health promotion programs. *Health Education Quarterly*, *20*, 161-178.

Goodman, R. M., & Steckler, A. B. (1989). A model for the institutionalization of health promotion programs. *Family and Community Health*, *11*, 63-78.

Grol, R. (1997). Personal paper: Beliefs and evidence in changing clinical practice. *British Medical Journal*, *315*, 418-421.

Grol, R. T. P. W., Everdingen, J. J. E., & Casparie, A. F. (1994). *Implementation of guidelines and changes—a manual for medical, paramedical and nursing practice*. Utrecht, the Netherlands: De Tijdstroom.

Janssen Andeweg, C. (1994). *The organizational culture inventory, a comparing study*. Unpublished doctoral thesis, University of Leiden, Leiden, the Netherlands.

Joyce, B., & Schowers, B. (1988). *Student achievement through staff development*. New York: Longman.

Kellerman, S. E., & Herold, J. (2001). Physician response to surveys. A review of the literature. *American Journal of Preventive Medicine*, *20*(1), 61-67.

Lewis, L. K., & Seibold, D. R. (1996). Communication during intraorganizational innovation adoption: Predicting users' behavioral coping responses to innovation in organizations. *Communication Monographs*, *63*, 131-157.

Moskowitz, W. B., Schwartz, P. F., & Schieken, R. M. (1999). Childhood passive smoking, race, and coronary artery disease risk: The MCV Twin Study. Medical College of Virginia. *Archives of Pediatrics Adolescent Medicine*, *153*, 446-453.

O'Loughlin, J., Renaud, L., Richard, L., Sanchez-Gomes, L., & Paradis, G. (1998). Correlates of the sustainability of community-based heart health promotion interventions. *Preventive Medicine*, *27*, 702-712.

Paulussen, T. G. W. M. (1994). *Adoption and implementation of AIDS education in Dutch secondary schools*. Unpublished doctoral thesis, University of Maastricht, Maastricht, the Netherlands.

Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007
© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.

Pijpers, F. I. M. (1999). *School health policy in elementary schools*. Unpublished doctoral thesis, University of Leiden, Leiden, the Netherlands.

Reijneveld, S. A., Brugman, E., & Hirasing, R. A. (2000). Infantile colic: Maternal smoking as potential risk factor. *Archives of Diseases in Children*, *83*, 302-303.

Renaud, L., Chevalier, S., Dufour, R., O'Loughlin, J., Beaudet, N., Bourgeois, A., et al. (1997). Evaluation of the implementation of an educational curriculum: Optimal interventions for the adoption of an educational program of health in elementary schools. *Canadian Journal of Public Health*, *88*, 351-353.

Rogers, E. M. (1995). *Diffusion of innovations*. New York: Free Press.

Schulman, J. A., Trujillo, M. J., & Karney, B. R. (2001). Facets: Computer software for evaluating assessment tools. *American Journal of Health Behavior*, *25*(1), 75-77.

Shediac-Rizkallah, M. C., & Bone, L. R. (1998). Planning for the sustainability of community-based health programs: Conceptual frameworks and future directions for research, practice and policy. *Health Education Research*, *13*, 87-108.

Steckler, A. B., Goodman, R. M., McLeroy, K. R., Davis, S., & Koch, G. (1992). Measuring the diffusion of innovative health promotion programs. *American Journal of Health Promotion*, *6*, 214-224.

Steensma, H. (1977). *Trends in organizational change*. Utrecht, the Netherlands: Lemma BV.

STIVORO. (1999). *How is the project "Smoking? Not in the Presence of the Little One" working out?* Unpublished manuscript, STIVORO.

World Health Organization, Division of Noncommunicable Diseases. (1999). *Tobacco free initiative: International consultation on environmental tobacco smoke and child health. WHO report on tobacco smoke and child health 1999*. Retrieved March 30, 2005, from www.ash.org/who-ets-rpt.html

Downloaded from http://heb.sagepub.com at BIBLIOTHEEK DER on February 27, 2007
© 2006 Society for Public Health Education. All rights reserved. Not for commercial use or unauthorized distribution.